“Do lean practices and business process reengineering improve transparency, responsiveness, and citizen satisfaction? Evidence from Cairo and Giza local government units in Egypt”

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DO LEAN PRACTICES AND BUSINESS PROCESS REENGINEERING IMPROVE TRANSPARENCY, RESPONSIVENESS, AND CITIZEN SATISFACTION? EVIDENCE FROM CAIRO AND GIZA LOCAL GOVERNMENT UNITS IN EGYPT

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Abstract

Local government units in Egypt operate under high administrative centralization and complex procedures, which raises concerns about internal efficiency, service responsiveness, and citizen satisfaction. This study examines how lean management practices and business process reengineering (BPR) are associated with internal process transparency, service responsiveness, and perceived citizen satisfaction in Cairo and Giza local administrations in Egypt. A cross-sectional survey was conducted among 384 employees selected through multi-stage stratified sampling from district, city, and governorate units. Data were collected between January 1 and May 1, 2025, using a structured questionnaire covering five constructs measured on five-point Likert scales, and the proposed relationships were analyzed using confirmatory factor analysis and structural equation modeling. The measurement model showed good fit ($\chi^2(160) = 285.4$, CFI = 0.95, TLI = 0.94, RMSEA = 0.045, SRMR = 0.041). The structural results indicate that lean management practices have a strong positive effect on internal process transparency ($\beta = 0.48$, $p < .001$), internal transparency significantly enhances service responsiveness ($\beta = 0.56$, $p < .001$), and service responsiveness strongly predicts citizen satisfaction ($\beta = 0.62$, $p < .001$), while BPR has a small, non-significant direct effect on transparency ($\beta = 0.09$, $p = .176$). The model explains 32% of the variance in internal transparency, 31% in service responsiveness, and 39% in citizen satisfaction. Overall, the findings suggest that lean-based improvements – operating through clearer internal processes and stronger responsiveness – offer a practical pathway for strengthening local governance performance in Egypt, whereas BPR effects appear more contingent and indirect.

Keywords lean, reengineering, transparency, responsiveness, satisfaction, governance, bureaucracy, e-government, Egypt, SEM

JEL Classification H83, H70, M11, O21

INTRODUCTION

Historically, the central ministries and governorates have dominated Egypt's local government system, whereas cities, districts, and villages have enjoyed limited functional autonomy. Despite various reform initiatives since the 2011 uprising and the broad discussion of decentralization, local units continue to operate under overlapping mandates, constrained fiscal authority, and complex administrative procedures. These conditions weaken the ability of local government units to deliver services in a timely and equitable manner, contribute to spatial inequalities, and weaken citizens' trust in public institutions.

Conflict of interest statement:
Author(s) reported no conflict of interest

In this context, managerial approaches that focus on how the design and execution of administrative processes are carried out – instead of, or in addition to, formal structures and legislation – have increasingly gained relevance. Lean management and business process reengineering (BPR) form two complementary approaches offering tangible tools for addressing chronic inefficiencies in public organizations. Lean management emphasizes the identification and elimination of activities that do not add value, the creation of smoother process flows, and continuous improvements in service delivery. BPR, in turn, requires the fundamental rethinking and radical redesign of workflows, separating value-adding core activities from redundancy or subsidiary work. These approaches can be jointly used to simplify procedures, shorten processing times, and refocus public services on citizen value instead of administrative convenience.

In Egypt, lean principles and reengineering ideas have been applied mainly in construction, manufacturing, and selected service sectors, where they have shown promise for enhancing time, cost, and quality performance. Their systematic use in local public administration has remained sparse and fragmented. Simultaneously, local governance is also shaped by broader political–economic constraints such as central state ownership patterns, dense regulatory frameworks, and restricted local discretion. These factors raise important questions about the realism of adapting and localizing lean management and BPR within Egyptian local government units.

1. LITERATURE REVIEW AND HYPOTHESES

Egyptian local governance operates within a long-standing tradition of strong central control and limited local discretion. Formally, the system is organized into governorates, cities, districts, and villages, with local councils intended to represent citizens. In practice, however, decision-making authority remains concentrated in centrally appointed governors and executive councils, whose accountability is predominantly upward to line ministries rather than downward to local communities (Ramadan & Akman, 2025; Ghonim et al., 2025; Ministry of Planning and Economic Development, 2024). Local government units (LGUs), therefore, often function primarily as implementers of centrally defined policies, operating with limited autonomy to prioritize, finance, and manage local development programs. Overlapping mandates, fragmented responsibilities, and complex procedures further limit their ability to deliver timely, equitable, and citizen-oriented services (Shantir, 2022).

The post-2011 political opening renewed attention to decentralization, transparency, and accountability in constitutional texts and policy agendas. Yet most analyses conclude that reforms have been partial and uneven, with limited change in the underlying balance of power between central and local levels (Ramadan & Akman, 2025; Shantir, 2022). Capacity-building initiatives – including decentralization and SDG-localization training (The Hague Academy for Local Governance, 2023) and City WORKS-related workshops (GIZ/City WORKS, 2023) – have supported awareness and skills in participatory planning and performance-oriented management. However, the persistence of centralized decision rights and procedure-heavy administrative systems means that governance outcomes still depend heavily on how internal processes are designed and executed within LGUs.

This institutional environment is also shaped by broader political–economic dynamics that influence public service provision. Debates around state ownership, privatization, and public–private partnerships reflect tensions between state-led development and private-sector participation (Sayigh, 2023). Central agencies continue to determine key parameters such as tariffs, standards, and investment priorities, while LGUs have limited discretion to adapt service delivery to local needs. Such arrangements generate multiple and sometimes conflicting lines of accountability and narrow the feasible space for local experimentation in process redesign. Accordingly, managerial approaches such as lean management and business process reengineering (BPR) should not be treated as purely technical tools but rather as interventions that operate within a system characterized by centraliza-

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tion, path dependence, and risk aversion (Awad et al., 2025; Ramadan & Akman, 2025; Sayigh, 2023; Memon et al., 2024).

Lean management has emerged internationally as a prominent approach to improving public sector performance by focusing on value creation for the end user and waste reduction across the value stream. Core principles – defining value from the user perspective, mapping the value stream, improving flow, and pursuing continuous improvement – have been adapted to public settings where performance includes equity, transparency, and procedural fairness, not efficiency alone (Gebre et al., 2012; Rodgers & Antony, 2019). Empirical work suggests that lean interventions can shorten processing time, eliminate redundant steps, rationalize workflows, and enhance service quality, particularly when supported by leadership commitment, staff engagement, and appropriate performance metrics (Aly, 2014; Rodgers & Antony, 2019).

In Egypt, lean applications have been most visible in construction and infrastructure contexts. Studies show that lean tools such as process planning and time-reduction practices can improve project time, cost, and quality performance (Swefie, 2013; Shaqour, 2022; Iskraemeco, 2023), while also noting constraints such as limited awareness, scarce skilled practitioners, and contracting arrangements that may conflict with lean principles. In the service sector, Awad et al. (2022) report that lean management practices enhance economic sustainability through resource optimization and process-efficiency improvements. Overall, the Egyptian evidence indicates that lean can be adapted to local organizational realities, but outcomes depend on training, leadership, and supportive institutional conditions (Shams Eldin et al., 2025; Almanbahi et al., 2025; Alahmari & Awad, 2025).

BPR provides a complementary and more radical approach, commonly defined as the fundamental rethinking and redesign of processes to achieve substantial improvements in cost, quality, service, and speed. BPR approaches typically involve identifying strategically important processes, analyzing existing workflows to detect bottlenecks and waste, designing new process architectures (often supported by IT), and implementing change through cross-functional coordination under strong leadership (Al-Embabi et al., 2024). In public administration, BPR has been used to consolidate fragmented procedures and support one-stop-shop service delivery. At the same time, poorly designed or purely top-down BPR efforts may disrupt operations without producing sustainable improvements, especially when change management and organizational culture are neglected.

In Egypt, BPR has been discussed as a modernization approach for legacy bureaucratic systems and for improving administrative alignment with reform agendas. The literature emphasizes that success depends on continuity of leadership, staff involvement, and institutional support; otherwise, redesign efforts may remain partial or limited to formal documentation rather than implementation. For LGUs, BPR is relevant to high-impact processes such as budgeting, project approvals, licensing, local revenue collection, and coordination interfaces between ministries and governorates. It is also closely connected to transitions from paper-based to digital workflows under e-government programs.

Because both lean and BPR require organizational change, resistance becomes an important implementation constraint. Classical change management theory suggests that resistance may arise from perceived losses in status or control, misunderstanding of the change, or low tolerance for uncertainty (Kotter & Schlesinger, 1989, 2008). Recommended strategies include communication and education, participation and involvement, facilitation and support, and – when necessary – negotiation and agreement. In public sector contexts marked by hierarchy and high-power distance, resistance can be more pronounced and may reduce bottom-up innovation. Lean and BPR initiatives in LGUs, therefore, require deliberate change management that builds internal coalitions, develops skills, and signals political support from senior leadership.

Taken together, the literature indicates a conditional but promising potential for applying lean and BPR in Egyptian organizations. Evidence points to improvements in cost, time, and quality in both construction and services (Swefie, 2013;

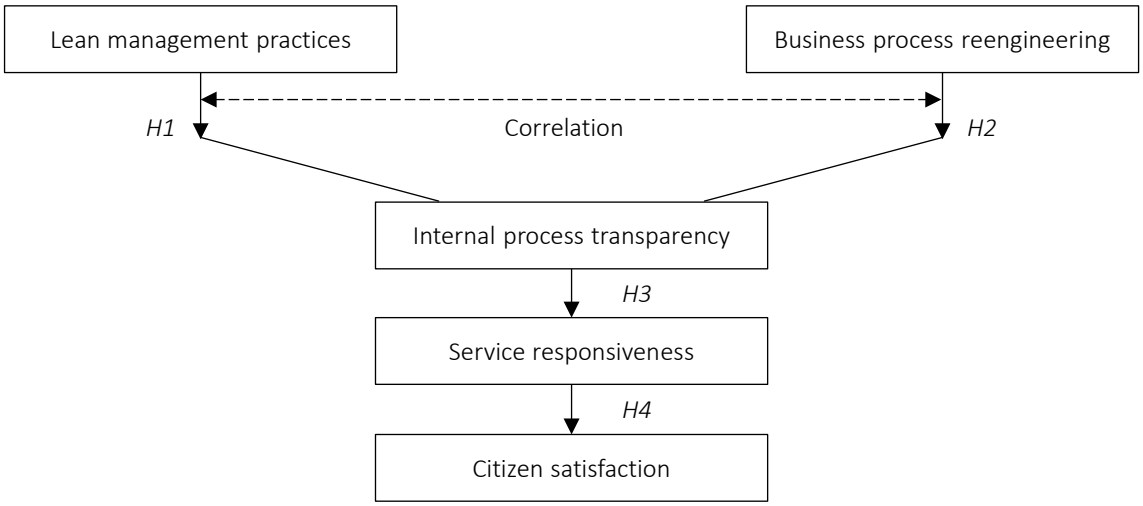

Figure 1. Research model

Aly, 2014; Awad et al., 2022), while also emphasizing barriers such as limited competence, awareness gaps, resistance to change, and governance constraints (Pandey & Tyagi, 2018; Shaqour, 2022; Shaqour et al., 2025). This implies that in Egyptian LGUs, process reforms are likely to be most effective when they translate into governance-relevant mechanisms – particularly transparency and responsiveness – rather than being assessed only as internal efficiency initiatives.

Building on this synthesis, the proposed framework treats lean management practices and BPR implementation as two process-oriented managerial interventions in LGUs. Lean practices reflect continuous, incremental improvements (e.g., standardization, simplification, visual management, small-cycle improvements), while BPR reflects more radical redesign of selected high-impact processes. The framework focuses on the mechanism through which these interventions improve governance outcomes: (1) process reforms enhance internal process transparency (clearer steps, clearer responsibilities, more traceable procedures), (2) transparency supports service responsiveness (faster handling, fewer bottlenecks, clearer service commitments), and (3) responsiveness increases perceived citizen satisfaction through improved service experiences. Although contextual conditions such as IT capability, regulatory constraints, and organizational culture can shape feasibility, this study concentrates on testing the direct mechanism shown in the model (lean/BPR → transparency → responsiveness → satisfaction).

In sum, prior research supports the relevance of lean and BPR as process reform approaches and highlights the centrality of transparency and responsiveness to public value and citizen-oriented performance, yet evidence remains limited in Egyptian LGUs regarding the full pathway linking these elements.

This study examines how lean management practices and business process reengineering (BPR) are associated with internal process transparency, service responsiveness, and perceived citizen satisfaction in Cairo and Giza local administrations in Egypt.

In line with this reasoning, the following hypotheses are proposed:

H1: Lean management practices in local government units have a positive effect on internal process transparency.

H2: Business process reengineering implementation in local government units has a positive effect on internal process transparency.

H3: Internal process transparency has a positive effect on service responsiveness in local government units.

H4: Service responsiveness has a positive effect on citizen satisfaction with local government services.

Figure 1 presents the conceptual research model. Lean management practices and BPR implemen-

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tation are shown as two exogenous constructions pointing to internal process transparency. Internal process transparency then links to service responsiveness, which ultimately leads to citizen satisfaction. This left-to-right chain reflects the framework's core logic: process-focused managerial practices improve transparency, transparency enhances responsiveness, and responsiveness increases citizen satisfaction in Egyptian local governance.

2. METHODS

The study adopted a quantitative explanatory design based on a cross-sectional survey among employees working in local government units within the Cairo and Giza governorates. The study was conducted in Cairo and Giza, Egypt, and data were collected between January 1 and May 1, 2025. The empirical focus was on staff who are directly or indirectly involved in local service delivery and internal management processes because these employees are best positioned to report on the extent of lean management practices, business process reengineering, internal process transparency, and service responsiveness in their organizations. Therefore, the target population was defined as civil servants and managers employed in district administrations (ahya'), city-level directorates, and central administrative units within the Cairo and Giza governorates, including both urban and mixed urban–rural jurisdictions. This population is relevant because it reflects the employees who implement and monitor administrative workflows (permits/licensing, taxation, complaints handling, HR/finance/procurement, and IT/e-government), and thus are able to assess internal process clarity and responsiveness at the operational level. This definition ensured that the study reflected the operational reality of local governance within Egypt's largest metropolitan region, where the administrative workload, citizen expectations, and exposure to digital transformation initiatives are highly pronounced.

This was ensured through the drawing of a scientifically valid sample by adopting a multi-stage stratified sampling strategy. First, Cairo and Giza were treated as two primary strata. Second, to represent different socio-economic contexts and levels of urbanization, a set of districts was purposively selected within each governorate, including central metropolitan districts, peripheral urban districts, and mixed urban–rural areas. The purposive selection at this stage was used to ensure contextual diversity and to capture variation in service pressure and administrative complexity across local units. At the second stage, within each district, the main local administrative unit and its key directorates were identified as sampling clusters. Sampling focused on three functional domains, namely: (1) service delivery, which includes permits and licenses, local taxation, and complaints handling; (2) administrative support, such as human resources, finance, and procurement; and (3) IT, e-government, or performance monitoring. In the third stage, employees within these clusters were stratified by job level into senior and middle managers, frontline officers, and IT/digital or performance staff. Lists of employees in each stratum were obtained from human resource departments and served as the sampling frames. Subsequently, respondents were selected using simple random sampling within each stratum; the number of employees selected was proportional to the stratum size to reflect the actual composition of the workforce in the Cairo and Giza LGUs.

To ensure transparency and replicability, the study followed the following procedure (algorithm): (1) define the target population and sampling strata (Cairo vs. Giza); (2) select districts to represent central, peripheral, and mixed contexts; (3) identify clusters (LGU units/directorates) within selected districts; (4) stratify staff by functional domain and job level; (5) randomly select respondents proportionally from HR lists; (6) distribute the questionnaire and collect completed forms during the fieldwork period (January–May 2025); (7) screen responses for completeness and remove invalid cases; and (8) analyze the measurement and structural models using CFA and SEM.

Cochran's formula for large populations with a 95% confidence level and 5% margin of error results in approximately 384 respondents as the minimum acceptable number for robust statistical analysis and structural equation modeling (Podsakoff et al., 2003; Creswell, 2018; Romo et al., 2024).

Anticipating non-response and incomplete questionnaires, and to allow subgroup analyses by governorate, job level, and functional area, a greater number of questionnaires were distributed. In total, 500 questionnaires were distributed, proportionally allocated across strata. A total of 384 usable questionnaires were retained for analysis after data screening, which meets the minimum recommended sample size and supports statistical power for testing the hypothesized relationships.

Data were gathered through a structured self-administered questionnaire designed for the purpose of this analysis. The instrument was directly derived from the conceptual framework and comprised five multi-item scales, in addition to a short section on background variables. All substantive items were measured on a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The first scale captured lean management practices and included items on systematic identification and removal of non-value-adding steps, efforts toward streamlining and standardization of workflows, the use of simple visual tools to monitor work in progress, and encouraging continuous small improvements rather than one-off campaigns (Aly, 2014; Rodgers & Antony, 2019; Ait Abdelmalek & Houfaidi, 2023). The second scale captured BPR implementation and assessed whether key administrative processes had been fundamentally redesigned, whether redesign reduced the number of steps and approvals required, whether cross-functional teams were involved, and whether information systems/workflows were adapted to support the redesigned processes (Al-Embabi et al., 2024).

The third scale operationalized internal process transparency as perceived by staff. Items assessed whether procedures for core services were clearly documented and accessible, whether responsibilities at each step were clearly assigned, whether information on processing times/backlogs/performance was shared within the unit, and whether staff could determine the current status of a citizen request (Moyano-Fuentes, & Sacristán-Díaz, 2012; Hair et al., 2022). The fourth scale measured service responsiveness, capturing the unit's ability to process citizen requests within promised timeframes, resolve problems quickly, minimize repeated visits, and respond flexibly to justified urgent needs. The fifth scale measured citizen satisfaction as perceived by employees, using items reflecting perceptions of how citizens evaluate overall quality, fairness, and trustworthiness of services, and whether citizens would recommend the unit's services to others (Bouckaert & Halligan, 2008; Hassan, 2025; Shma et al., 2025). The final section collected background information on gender, age group, years of public sector experience, position level, main functional area, type of local unit (urban, rural, or mixed), and governorate.

The questionnaire was originally drafted in English and translated into Arabic to ensure accessibility. An expert bilingual in public administration translated the items into Arabic, followed by back-translation into English by another bilingual expert. Discrepancies were discussed and resolved to ensure conceptual and semantic equivalence (Hair et al., 2019). To enhance content validity, the Arabic instrument was reviewed by academics specializing in public management and local governance and by experienced managers from Cairo and Giza local administrations, who assessed clarity, relevance, and contextual appropriateness. Minor wording refinements were made to fit everyday administrative practice in Egyptian LGUs while preserving the constructs.

Participation was voluntary. Respondents were informed about the study purpose, that their answers would be used only for academic research, and that they could decline participation or stop at any time without any consequences. No personally identifying information was collected, and responses were handled anonymously and analyzed in aggregate form to reduce the risk of bias and protect confidentiality. Completing and submitting the questionnaire was treated as informed consent.

This design anchored the study in a well-defined population (employees of Cairo and Giza LGUs), employed a multi-stage stratified sampling strategy supported by sample-size theory, and used a carefully developed questionnaire operationalizing lean management practices, BPR implementation, internal process transparency, service responsiveness, and citizen satisfaction through validated Likert-type scales.

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3. RESULTS

In all, 500 questionnaires were distributed to employees in local government units, and 384 usable responses were received, for a valid response rate of 76.8%. Respondents represent a diverse distribution across gender, age, experience, job level, and functional area, which supports analysis of process practices and perceived service outcomes across roles and units (Table 1).

Table 1. Respondent profile (N = 384)

Variable	Category	Frequency	Percentage (%)
Gender (F1)	Male	240	62.5
	Female	144	37.5
Age (F2)	< 30 years	83	21.6
	30–39 years	141	36.7
	40–49 years	112	29.2
	≥ 50 years	48	12.5
Public sector experience (F3)	< 5 years	95	24.7
	5–9 years	135	35.2
	10–14 years	81	21.1
	≥ 15 years	73	19.0
Position level (F4)	Senior management	57	14.8
	Middle management	124	32.3
	Frontline officer	143	37.2
	IT/digital/ performance staff	60	15.6
Functional area (F5)	Service delivery	199	51.8
	Administrative support	113	29.4
	IT/e-government/ performance monitoring	72	18.8
Type of local unit (F6)	Urban	160	41.7
	Rural	136	35.4
	Mixed	88	22.9
Level of e-government use (F8)	Very low	15	3.9
	Low	52	13.5
	Moderate	113	29.4
	High	121	31.5
	Very high	83	21.6

Table 1 shows that the sample includes a balanced mix of ages, experience levels, job levels, and functional areas, which is suitable for examining lean practices, business process reengineering (BPR), and perceived service performance in local government units.

Descriptive statistics for the five main constructs – lean management practices (LEAN), BPR implementation (BPR), internal process transparency (TRAN), service responsiveness (RESP), and citizen satisfaction (CSAT) – are presented in Table 2. Each construct was computed as the mean of four Likert-scale items (1 = strongly disagree, 5 = strongly agree).

Mean values range between 3.30 and 3.65, indicating moderate to moderately high perceptions of lean practices, BPR initiatives, transparency, responsiveness, and citizen satisfaction. Standard deviations are around 0.60–0.70, suggesting meaningful variability among respondents.

The correlation matrix in Table 2 shows that LEAN is positively correlated with internal process transparency ($r = 0.45$, $p < .001$) and service responsiveness ($r = 0.39$, $p < .001$). BPR is positively correlated with transparency ($r = 0.18$, $p < .01$). Internal process transparency is positively correlated with service responsiveness ($r = 0.52$, $p < .001$), and service responsiveness is strongly correlated with citizen satisfaction ($r = 0.60$, $p < .001$). Overall, the correlation structure is consistent with the directional logic of the conceptual model (Figure 1).

Table 2. Descriptive statistics and correlations of main constructs

Construct	Mean	SD	Min	25%	50%	75%	Max
LEAN	3.60	0.68	1.75	3.00	3.75	4.25	5.00
BPR	3.45	0.65	1.75	3.00	3.50	4.00	5.00
TRAN	3.50	0.70	1.75	3.00	3.50	4.00	5.00
RESP	3.55	0.69	1.75	3.00	3.50	4.00	5.00
CSAT	3.40	0.66	1.75	3.00	3.50	4.00	5.00

Note: LEAN = lean management practices; BPR = business process reengineering implementation; TRAN = internal process transparency; RESP = service responsiveness; CSAT = citizen satisfaction.

Table 3. Correlation matrix

	LEAN	BPR	TRAN	RESP	CSAT
LEAN	1.000	0.32	0.45	0.39	0.35
BPR	0.32	1.000	0.18	0.22	0.16
TRAN	0.45	0.18	1.000	0.52	0.41
RESP	0.39	0.22	0.52	1.000	0.60
CSAT	0.35	0.16	0.41	0.60	1.000

Note: LEAN = lean management practices; BPR = business process reengineering implementation; TRAN = internal process transparency; RESP = service responsiveness; CSAT = citizen satisfaction.

As shown in Table 3, the correlation structure is consistent with the conceptual model in Figure 1,

particularly regarding the relationships between lean practices and transparency, transparency and responsiveness, and responsiveness and citizen satisfaction.

The measurement properties of the five latent constructs were assessed using confirmatory factor analysis (CFA). Each construct was modeled as a first-order factor with four reflective indicators. All items loaded significantly on their intended factors, with standardized loadings ranging from 0.68 to 0.88.

As reported in Table 4, Cronbach's alpha and composite reliability (CR) values for all constructs exceeded 0.70, indicating satisfactory internal consistency. Average variance extracted (AVE) for each construct ranged between 0.51 and 0.64, supporting convergent validity. Discriminant validity was supported using the Fornell–Larcker criterion, as the square root of AVE for each construct exceeded its correlations with other constructs.

The overall fit of the measurement model was acceptable: $\chi^2(160) = 285.4$, $p < .001$; CFI = 0.95; TLI = 0.94; RMSEA = 0.045 (90% CI: 0.036–0.053); SRMR = 0.041. These indices indicate that the measurement model fits the observed data well, supporting subsequent structural testing.

The overall fit of the measurement model was acceptable: $\chi^2(160) = 285.4$, $p < .001$; CFI = 0.95; TLI = 0.94; RMSEA = 0.045 (90% CI: 0.036–0.053); SRMR = 0.041. These indices indicate a good fit between the hypothesized factor structure and the observed data, providing a sound basis for testing the structural relationships among the constructs.

The structural model corresponds to the research framework shown in Figure 1, in which LEAN and BPR are exogenous constructs, TRAN and RESP act as sequential mediators, and CSAT is the final outcome. The model was estimated using robust maximum likelihood.

The fit of the structural model was satisfactory: $\chi^2(162) = 293.7$, $p < .001$; CFI = 0.95; TLI = 0.94; RMSEA = 0.046; SRMR = 0.045. Table 5 summarizes the standardized path coefficients and significance levels.

Table 4. Measurement model: Factor loadings, reliability, and convergent validity

Construct / Item	Standardized loading	Cronbach's α	CR	AVE
Lean management practices (LEAN)				
LEAN1	0.78	0.84	0.86	0.60
LEAN2	0.81			
LEAN3	0.77			
LEAN4	0.80			
BPR implementation (BPR)				
BPR1	0.72	0.79	0.82	0.54
BPR2	0.75			
BPR3	0.78			
BPR4	0.71			
Internal process transparency (TRAN)				
TRAN1	0.79	0.83	0.85	0.59
TRAN2	0.81			
TRAN3	0.76			
TRAN4	0.77			
Service responsiveness (RESP)				
RESP1	0.82	0.86	0.88	0.64
RESP2	0.85			
RESP3	0.80			
RESP4	0.78			
Citizen satisfaction (CSAT)				
CSAT1	0.77	0.82	0.84	0.58
CSAT2	0.80			
CSAT3	0.75			
CSAT4	0.76			

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Table 5. Structural model results and hypothesis testing

Hypothesis	Path	Standardized β	t-value	p-value	Result
H1	Lean management → Internal transparency	0.48	7.52	< .001	Supported
H2	BPR implementation → Internal transparency	0.09	1.35	.176	Not supported
H3	Internal transparency → Service responsiveness	0.56	9.10	< .001	Supported
H4	Service responsiveness → Citizen satisfaction	0.62	10.45	< .001	Supported

As shown in Table 5, lean management practices have a positive and statistically significant effect on internal process transparency (β = 0.48, p < .001). BPR implementation shows a positive but statistically non-significant association with internal transparency (β = 0.09, p = .176). Internal process transparency has a strong positive effect on service responsiveness (β = 0.56, p < .001), and service responsiveness has a strong positive effect on citizen satisfaction (β = 0.62, p < .001).

The model explains a substantial share of variance in the mediating and outcome constructs. Internal process transparency has an R^2 of 0.32, service responsiveness has an R^2 of 0.31, and citizen satisfaction has an R^2 of 0.39. Thus, three of the four hypothesized relationships are supported (H1, H3, H4), while H2 is rejected.

4. DISCUSSION

The purpose of this study was to examine how lean management practices and business process reengineering (BPR) relate to internal process transparency, service responsiveness, and citizen satisfaction in Egyptian local government units (LGUs) in Cairo and Giza. The research model proposed that lean and BPR would enhance internal transparency, that transparency would improve service responsiveness, and that responsiveness would increase citizen satisfaction. The structural model supports three of the four hypotheses: lean management is positively associated with internal process transparency (H1), transparency is positively associated with service responsiveness (H3), and responsiveness is positively associated with citizen satisfaction (H4). Taken together, these findings indicate a clear "process-to-governance" pathway in which internal process practices translate into citizen-facing outcomes through two sequential mechanisms – transparency and responsiveness – rather than through direct "reform labels" alone. This is particularly relevant in Egypt's centralized local administration, where procedural complexity often shapes citizen experiences more immediately than formal policy intentions.

The strong relationship between lean management practices and internal process transparency (H1) is consistent with lean's operational logic, which stresses workflow simplification, standardization, and continuous elimination of non-value-adding steps. Empirically, this aligns with prior public-sector lean studies that report improvements in process visibility, reduced ambiguity in handoffs, and clearer service routines when lean tools are used to map and stabilize workflows (e.g., Rodgers & Antony, 2019; Aly, 2014). In Egyptian LGUs, this association plausibly reflects the value of lean routines – such as clarifying process steps, defining responsibilities, and tracking cases – in environments where administrative work is often fragmented across departments and approval layers. Therefore, "transparency" in this study should be interpreted primarily as internal operational transparency – i.e., the extent to which staff can see, understand, and track the workflow – rather than transparency as public disclosure alone. This distinction matters because internal transparency is a practical precondition for consistent service execution in systems where procedures may exist formally but remain unclear in implementation.

The results show that internal process transparency is a strong predictor of service responsiveness (H3). This mechanism is theoretically intuitive: when procedures are documented and accessible, responsibilities are defined, and the status of cases can be tracked, units can handle requests faster and with fewer repeated visits. This finding supports broader arguments in public management that process visibility and role clarity reduce discretionary delays and bottlenecks, enabling more reliable service performance (Bouckaert & Halligan, 2008; Rodgers & Antony, 2019). In a centralized administrative

setting, where discretion is often constrained and approvals are layered, improvements in visibility and coordination can yield meaningful gains in responsiveness even without large structural reform. Thus, the study suggests that transparency is not merely an institutional value; it is also an operational capability that supports timely and predictable service delivery.

Service responsiveness has the strongest downstream association with citizen satisfaction (H4), which is consistent with service quality research that identifies timeliness, reliability, and problem resolution as key drivers of perceived satisfaction. In other words, what citizens experience most directly is the speed and predictability of service, not the specific managerial framework used internally. This aligns with public service performance perspectives emphasizing that citizen satisfaction is shaped by the practical interaction quality and the extent to which services meet expectations for timeliness and fairness (Bouckaert & Halligan, 2008). The implication is that performance reforms in LGUs – whether process-focused or digital – should be assessed by their observable effect on responsiveness at the service interface, because this is the most proximal determinant of satisfaction.

The only unsupported hypothesis is H2 (BPR → transparency). The non-significant direct path suggests that, in these LGUs, BPR as perceived by employees is not yet translating into improved day-to-day procedural clarity. This pattern is consistent with public-sector experiences where reengineering initiatives may be formalized as episodic projects (e.g., new manuals, restructured approval chains, or isolated systems) without being institutionalized into routine workflow practices that staff can observe and use consistently. Compared with lean, which emphasizes continuous incremental improvements, BPR often depends on larger implementation conditions – change management, cross-functional integration, and stable IT/process alignment – before staff perceive transparency gains. Moreover, during transition phases, radical redesign can temporarily reduce perceived transparency because roles and systems are changing simultaneously and staff are still learning the "new process."

A second plausible explanation is measurement alignment: the transparency scale used here captures documentation, role clarity, information sharing, and case-status visibility. If BPR efforts in these LGUs focus more on structural consolidation or high-level process reconfiguration than on daily workflow visibility and communication, then their effects may be indirect or delayed rather than immediate and direct. Accordingly, future research could test alternative specifications, such as (a) BPR → IT workflow integration → transparency, (b) BPR → role redefinition → transparency, or (c) BPR effects moderated by implementation maturity.

The overall pattern suggests that, at the current stage of administrative reform in Cairo and Giza, lean management functions as a more immediate lever for strengthening operational transparency and, through it, service responsiveness and citizen satisfaction. This does not imply that BPR is unimportant; rather, it suggests that BPR's contribution may depend on implementation quality and institutionalization. In a centralized and regulation-intensive context, reforms that produce visible operational routines (e.g., standard steps, clear responsibilities, trackable cases) may deliver faster improvements than reforms framed primarily as redesign projects. Therefore, a practical reform approach for LGUs may involve using BPR selectively for high-impact processes, while embedding lean routines to stabilize, document, and continuously improve the redesigned workflows – so that staff experience the reform as real transparency rather than as formal restructuring.

CONCLUSION

This study examined how lean management practices and business process reengineering (BPR) are associated with internal process transparency, service responsiveness, and perceived citizen satisfaction in local government units in Cairo and Giza, Egypt. The findings show that lean management is a signifi-

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cant driver of internal process transparency, and that greater transparency is linked to higher service responsiveness, which in turn strongly predicts perceived citizen satisfaction. These results indicate that citizen-oriented outcomes in Egyptian LGUs are most likely to improve when process reforms translate into operational visibility and consistent service responsiveness, rather than remaining as formal administrative redesign efforts.

In contrast, BPR did not exhibit a significant direct association with internal transparency, suggesting that reengineering initiatives – when not embedded into routine operational practices – may not be experienced by staff as clearer, more trackable procedures. This implies that redesign-focused reforms may require stronger institutionalization (e.g., sustained implementation, staff involvement, workflow stabilization, and clear internal communication) before measurable transparency gains occur.

From a practical perspective, LGUs should prioritize lean-based simplification of high-volume services, clear documentation and case-tracking of procedures, and responsiveness indicators (timeliness, predictability, first-time resolution) as operational tools to strengthen citizen experience and support Saudi/Egyptian-style public-sector modernization agendas (including Egypt Vision 2030). For BPR to add value, LGUs may apply it selectively to a small number of high-impact processes while ensuring that redesigned workflows are stabilized through lean routines and supported by usable e-government systems.

AUTHOR CONTRIBUTIONS

Conceptualization: Adel Ghonim.
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Investigation: Adel Ghonim.
Methodology: Adel Ghonim.
Project administration: Adel Ghonim.
Supervision: Adel Ghonim.
Validation: Adel Ghonim.
Visualization: Adel Ghonim.
Writing – original draft: Adel Ghonim.
Writing – review & editing: Adel Ghonim.

AI USE DECLARATION

The authors used an artificial intelligence–assisted writing tool (QuillBot) solely for language editing, including rephrasing sentences for clarity and improving grammar and readability. No AI tools were used for study design, data collection, statistical analysis, interpretation of results, or generation of scientific content. The authors reviewed and verified all revisions and take full responsibility for the accuracy and integrity of the manuscript.

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